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VOL. II

SASKATOON, SASK., FEBRUARY, 1936

No. 6

EDITORIAL

EDUCATION FOR WORLD CITIZENSHIP

By L. F. TITUS

(President, Saskatchewan Teachers' Federation)

IN the publishing house of the *Christian Science Monitor*, in Boston, is a unique representation of the world in which we live. It is a huge globe, constructed entirely of glass, on a steel framework, and faithfully reproducing to scale the surface features of the world. The visitor enters this "world" on a crystal bridge, constructed diametrically through its centre, and views it from the inside. It undoubtedly gives to the student who has access to it a very adequate idea of the geographical details of the globe, but perhaps its chief appeal is in the feeling impressed upon the mature visitor "that this is a pretty small world in which we live". As he stands on the crystal bridge he looks up at Saskatchewan; a slight turn of the head takes him to Japan, India, or Germany.

Indeed it is a small world we inhabit in this century. How closely the parts have drawn together since the days of Marco Polo or Columbus; in these times there were remote peoples; today no peoples can be said to be remote. The journey that took months then to accomplish, today takes only hours. We have bridged the seas with giant ocean liners. The most remote parts of the world have been brought close to one another by the airplane. The voice of man encircles the globe by means of the telephone and radio. Events in any part of the world become almost immediately the interest and concern of all mankind. The genius of man has knit the world into an interrelated and interdependent whole. Within the last century man has made greater material progress than in all the rest of recorded history. In his utilization of the resources so amply given by a provident nature, he has made possible, in its material aspects, the enjoyment of an abundant life. He has made it possible for people in any given section of the world to draw on the resources of nature in almost every other section of

the world. If nature fails him at one point, she will provide plenty at others. Each peopled part of the world is able to make contributions to the well-being of humanity as a whole.

The poverty in material goods so common in the world can be blamed on the inharmonious relations of man with man. Man's only struggle, apart from the development of his spiritual self, should be with the forces of nature to produce those material things necessary for his comfort and complete happiness. He has gone far indeed in this direction, but he has not yet seen the folly of maintaining the attitude of the jungle beast in his handling of the goods which are his to possess and distribute. Worse than the jungle beast, he plans the way on destruction of his own kind and the goods his God-given faculties and his own energies have been able to accumulate. Bountiful Nature makes it possible for man to free himself from want and drudgery, but the lack of harmony in a small world of men destroys her work.

Man's achievement on the one hand and his selfishness, mistrust, and destruction on the other, are a ridiculous contradiction which can and should be eliminated. In their times of calm thought, leaders of all nations have realized the oneness that should exist in the world. Attempts have been made to overcome the misunderstandings that keep the world divided. We have seen the establishment of a League of Nations, the signing of peace pacts and non-aggression pacts, and the deliberations of disarmament conferences. These have failed, or have had little success, because the members and conferees have been hampered by mistrust and fear of one another, mistrust and fear which exist largely because of ignorance and a lack of sympathetic understanding of the needs and aspirations of units of the world citizenry. The mistrust and fear exhibited by leaders is but a reflection of the mistrust and fear of the nationals whom they lead. Unless, in our interdependent world, all peoples are given fair access to the abundance which the earth can produce with man's aid, an abundance sufficient to abolish

poverty and drudgery, there can be no peace on earth.

Now the attitude of nation toward nation is but the collective attitudes of individuals. Only by education of the individual can the misunderstandings and mistrust of peoples be lessened. The church, the press, the radio, and other educational agencies can all do their part, but the hope of a brighter, more harmonious world depends upon the young. The school should do all in its power to develop the co-operating world citizen. Educational leaders have for many years recognized this fact and have worked for better international understanding. The World Federation of Educational Associations, representing every advanced country in the world, has emphasized international harmony at all its conferences. Men in service clubs have fostered international goodwill. The practical work, however, must be done on the plastic minds of youth. The school must impress upon the minds of boys and girls the consciousness that, to quote Hendrik Willen Van Loon, "We are all of us fellow passengers on the same planet and we are all of us equally responsible for the happiness and well-being of the world in which we live".

What are the points which should be emphasized in education for the development of the world citizen? The student should fully appreciate the cultural contributions made by the people of different eras and different races. He should realize that a knowledge of the beautiful works of art, literature, and philosophy, are far more important than the selfish ambitions of political states; that the contributions of Socrates, Plato, Jesus, Shakespeare, Goethe, are much more important than the conquests of Alexander or the political aspirations of Bismark. He should know the great men of every nation who deserve the right to be called world heroes. He should see that true greatness overruns

national boundaries; that the character of men controlling events is of more importance than the events they control; that a Milton or a Lincoln is more important than any political question of their times; that the work of Pasteur is more important than the Franco-Prussian War, and that of Florence Nightingale than the defeat of Russia in the Crimea. He should be familiar with the contributions, material and spiritual, that various peoples can make to his life, and he should be ready to accept those contributions. He should know what contributions he can make to the human society, and he should be inspired to make those contributions. He should know the needs and aspirations of peoples so that he can strive to see that those needs and aspirations are satisfied fairly and unselfishly.

Those subjects of the curriculum which lend themselves to a general view of the world, namely, geography, history, literature, and kindred subjects should have the central place in the curriculum and should be taught with the ideal of bringing about a harmonious world in which there is a free interchange of peoples and goods and well-planned leisure. Through geography the youth becomes familiar with the peoples of other lands, their modes of life, their possible contributions, and their needs. History can show the process of social growth. Through literature, including the literature of other nations, a patriotism can be taught which goes beyond national boundaries—a love of country based on its beauties, its associations, and its achievements, but embracing also a fellow-feeling for all peoples who similarly love their native lands.

Education tends to lag behind material progress. Our educational methods must keep abreast of a changing world. We cannot stand still; we must go forward or backward. To go backward is to drag down civilization; to go forward is to point the path to a better way of life.

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Topics of Interest

SARRAUT BECOMES PREMIER

Ordinarily the world at large does not become greatly agitated when France installs a new premier. In recent years, due no doubt to economic conditions, these changes in the premierships of France have been very frequent. However, the elevation of Sarraut to that office provokes more than passing comment because of the circumstances under which he was called upon to form a cabinet. Laval, who resigned to make way for Sarraut, was the sponsor along with Sir Samuel Hoare of the peace proposals to Italy and Ethiopia which were so roundly condemned by world opinion and by the League of Nations. As a matter of fact, Laval's resignation was brought about because of his attitude on foreign policy and particularly because of his friendly feelings towards Italy and his willingness to give that nation a free hand in Ethiopia. His stand, too, on oil sanctions and his half-hearted support of the collective system made him unpopular with the Chamber of Deputies.

His successor, Sarraut, has already won the confidence of the Chamber, and in a fighting speech the other day, he called on all political factions in France to unite for the good of the nation. In his address before the Chamber, he declared his support of the League, and emphasized the necessity of collective action in Europe. He extended to Germany, France's traditional enemy, an invitation to return to the League and work for peace.

The new premier entertains friendly feelings toward the British Empire. This, together with his declared support of the League and its policy of forcing Italy to abandon its campaign in Africa should do much towards preventing the present Italo-Ethiopian conflict from spreading to the rest of Europe. The vote of confidence in Sarraut also indicates that the French nation as a whole is strongly behind the League in the steps it has taken in the cause of peace.

THE DOMINION-PROVINCIAL CONFERENCE

In the second week of January of the present year, there was held in Ottawa a conference between the Dominion and Provincial Governments. At this conference many matters affecting the relationships between the Dominion and the Provinces were discussed. Among the matters agreed to were the following:

- (1) The amendment of the British North America Act to enable the Dominion, acting on the request of a Province, to assist the Province concerned in a refunding operation by extension of a Dominion Government guarantee if it was clearly evident the position of the Province renders such an operation essential.

The amendment to the Act would permit any Province whose bonds are guaranteed to secure the Dominion against loss by pledging as collateral security amounts payable by the Dominion from time to time as subsidies, and also to pledge other specific revenues.

(2) The establishment of a *Loan's Council* to approve any refunding plan and to supervise the future borrowings of any Province whose debt is converted under Dominion guarantee. A Loan's Council for any Province deciding to come under the plan will consist of the minister of finance of that Province with the governor of the Bank of Canada as advisor.

(3) The setting up of a National Finance Council whose duty it would be to co-ordinate policies relating to finance and public borrowings generally. This council would consist of the minister of finance of the Dominion and treasurers of all Provinces, with the governor of the Bank of Canada as advisor.

(4) Initiation on the part of the Dominion of amendments to the B. N. A. Act requested by the Provincial representatives to clarify and extend Provincial power of taxation with respect to gasoline, amusement, fuel, oil, retail sales, etc.

(5) The use of the Dominion machinery for income tax collection in collecting income tax levied under a Provincial statute, provided satisfactory arrangements can be made.

THE NAVAL CONFERENCE

The great events and happenings of the last three months have almost shut out from the public eye the doings of the naval conference which opened in London on December 9, 1935, and which has not yet concluded.

Delegates of five naval powers, namely, Great Britain, the United States, Japan, Italy, and France have for several weeks been attempting to come to some sort of an agreement that will serve as a substitute for the Treaty of Washington and the Treaty of London, both of which expire on December 31 of this year. From the very first there was general agreement by the observers of the conference that nothing much would be accomplished. This conclusion was arrived at because of the attitude of Japan on the question of "Parity". At the very first session Japan requested that the question of parity be first dealt with.

Here it may be well to recall that by the Treaty of Washington in 1922 an agreement was reached setting out what the relative naval strength in capital ships of the signatories of the treaty should be while the treaty was in force. This relative strength gave the nations in the order mentioned above the ratio of 15: 15: 9: 5: 5. Thus Great Britain and the United States were put on a parity, and Japan was allowed considerably better than half their strength. France and Italy were allowed slightly better than half of Japan's strength. The ratio of Great Britain to the United States to Japan was 5: 5: 3.

For two years Japan has been clamoring for parity with Great Britain and the United States. It was, therefore, expected that her first step at the conference would be to find out what the other powers' attitude was on this question. Failing the granting to her of parity, the Japanese delegates asked that the powers agree to a "common upper limit" which would leave the powers free to build their navies up to this "upper limit" according as their financial means allowed them.

Both suggestions were strongly opposed by the other powers. The United States asked for a straight reduction of 20% in each power's present naval strength. Great Britain wanted a continuation of the

Grade IX Arithmetic

Interest

If a person is in need of money, he can, under certain circumstances, borrow the money from the bank, or from a friend, or from some institution that is in the business of lending money. Before he gets the money, however, he usually agrees to pay the person from whom he borrows it a certain sum of money for the loan. Thus, if he wants to borrow \$100, he must be willing at the end of a certain time to return the \$100 together with an additional sum which he is willing to pay for the use of the money for the time that he has had it. The sum that he is willing to pay for the use of the money borrowed is called *interest*. This interest is usually determined as a certain percentage of the money borrowed. However, a man who borrows \$100 for a month should not pay as much interest as the man who borrows \$100 for 12 months. Hence it is clear that the length of time for which the money borrowed is kept before it is returned, is an important factor in determining the amount of interest that should be paid. Usually the amount of interest that should be paid in any given instance is determined by agreeing on what percentage of the sum borrowed should be paid as interest, if the sum is borrowed for a year. Thus, if we agree that 5% of the sum should be paid as interest if the sum is borrowed for a year, we say that the rate of interest is 5% per annum (per year). If, therefore, a person borrows \$350 for a year at 6% per annum, the interest he must pay is $6/100 \times 350$, or \$21. If he borrows it for 6 months, he would pay $6/100 \times 350 \times \frac{1}{2}$, or \$10.50; for 7 months he would pay $6/100 \times 350 \times 7/12 = \12.25 ; for 200 days he would pay $6/100 \times 350 \times 200/365 = \11.51 .

The sum borrowed is called the *principal*. The percentage of the principal that is charged as interest on the money borrowed for a year is called the *rate* per annum. Thus we see that the interest is equal to the product of the principal, the rate, and the time expressed in years, or briefly, $\text{interest} = \text{principal} \times \text{rate} / 100 \times \text{time in years}$.

Example 1. Find the interest on \$378 for 8 months at 7% per annum.

$$\text{Interest} = 378 \times 8/12 \times 7/100 = 17.64.$$

We see that four factors enter into an interest question. If, therefore, we know any three of the factors, we can find the remaining one. For example, if, in the above question, we knew the interest, principal, and rate, we could get the time by noting that

$$\begin{aligned} \text{the time} &= \frac{\text{interest} \times 100}{\text{rate} \times \text{principal}} \\ &= \frac{17.64 \times 100}{7 \times 378} = \frac{2}{3} \text{ years} = 8 \text{ months.} \end{aligned}$$

Or, if we knew the interest, principal, and time,

$$\begin{aligned} \text{the rate} &= \frac{\text{interest} \times 100}{\text{time} \times \text{principal}} = \frac{17.64 \times 100}{2/3 \times 378} \\ &= \frac{17.64 \times 100 \times 3}{2 \times 378} = 7\%. \end{aligned}$$

Or if we knew the interest, time, and rate,

$$\text{the principal} = \frac{\text{interest} \times 100}{\text{time} \times \text{rate}} = \frac{17.64 \times 100}{\frac{2}{3} \times 7} = \frac{17.64 \times 100 \times 3}{2 \times 7}$$

Students who have taken Grade IX Algebra sometimes find it more convenient to substitute x for the factor that is missing, thus obtaining an algebraic equation which when solved gives the result they are after. Thus, if we wanted to find the rate in the above example, we would substitute x for the rate in the formula:

$$\begin{aligned} \text{interest} &= \frac{\text{principal} \times \text{time} \times \text{rate}}{100} \\ \therefore 17.64 &= 378 \times \frac{2}{3} \times \frac{x}{100} \\ \therefore \frac{252}{100} x &= 17.64 \\ \therefore x &= \frac{17.64 \times 100}{252} = \frac{1764}{252} = 7\% \end{aligned}$$

Example 2. Find the time in which \$960 will produce \$42 of interest at 5% per annum.

$$\begin{aligned} 42 &= 960 \times \frac{5}{100} \times x \\ \therefore 48x &= 42 \\ \therefore x &= \frac{42}{48} = \frac{7}{8} \text{ years} = \frac{7}{8} \times 365 = 320 \text{ days.} \end{aligned}$$

Having studied carefully the method of finding the different factors in an interest question, do questions 1-20, pages 162 and 163, and questions 1-17, pages 165 and 166, text.

The interest we have discussed above is called *simple* interest in order to distinguish it from *compound* interest with which we shall deal later on. Briefly, the difference between the two types of interest is as follows. When the time for which money is borrowed is less than one year, the interest is usually calculated as above. When the time is longer than one year, then the interest for the year is added on to the principal and the interest for the next year or part thereof is calculated on principal plus interest.

Notes

When one person lends money to another, he usually requires from the person to whom the money is loaned written evidence that the loan has been made. The Dominion Parliament in a statute known as the *Bills and Notes Act* sets out the form in which the written evidence of the loan should be made. Departure from the form set out, by parties to a loan transaction, has frequently led to legal battles. Notes may be promissory notes or demand notes. The form of a promissory note is set out on page 166 of the text, and of a demand note on page 170. We

should note particularly that to be a promissory or demand note within the law, the written form must contain a *promise* to pay a *certain* person a *certain* sum of money on *demand*, or at a *certain* time. In other words, it *must* contain four things, namely, a definite promise, a definite person to whom the promise is made, a definite sum of money, and a definite time of repayment, unless the note states that the money is to be paid back on demand.

Read carefully the discussion in your text on *Notes*. Note that the law allows the borrower in the case of promissory notes (not demand notes) three days of grace. Thus if in the body of a note it says that the money is to be paid back in 60 days or 3 months, the borrower has really 63 days or 3 months and 3 days before he can be compelled by law to repay it. When the time is given in months in order to get the date of repayment, the months must be changed to days and the three days of grace added. Note also that by a month we mean a calendar month, that is, a month of 28 days or 29 days (in case of a leap year), or 30 days, or 31 days as the case may be. Thus a note made on Jan. 28 for 1 month would fall due, counting the three days of grace, on Mar. 3, providing the year was not a leap year. So also would notes made on Jan. 29, Jan. 30, and Jan. 31, for one month fall due on Mar. 3. In other words, *we must not* say that because a note made on, say, Jan. 30 for one month, falls due on Feb. 30, the two days that February is short must be made up in March, and that hence the date of maturity is Mar. 5.

Example 1. Find the amount of a note of \$730 dated Oct. 31, 1935, for 4 months, with interest at 5% per annum.

The number of days for which the note will bear interest is $30+31+31+29+3=124$ days.

$$\therefore \text{interest on note} = 730 \times 124 / 365 \times 5 / 100 = 12.40$$

$$\therefore \text{amount of note} = 730 + 12.40 = 742.40$$

Note that by the *amount* of a note we mean the face (that is, the sum shown on the face of the note) plus the interest.

All notes for \$100 or less require to have attached a three-cent stamp. All notes for sums greater than \$100 require a six-cent stamp. Now do questions 2-11, pages 169, text.

When a person takes a *demand* note as evidence of a loan transaction, it means that the money loaned becomes payable on demand, and if the money is not paid when the demand is made, the person who loaned the money can sue in a court for it. Usually, however, the person who loaned the money will accept part payments on account. The method of applying these part payments to satisfy the debt is set out on page 170. Now do questions 1-3, page 171.

Banking

As most of the transactions involving money are frequently intertwined with the business of banking, it is well for the student to be familiar with some, at least, of the bank's methods of doing business.

The banks are institutions that are chartered by the Dominion Government. At the present time there are eight chartered banks, namely, The Royal Bank, The Canadian Bank of Commerce, The Bank of Montreal, The Bank of Nova Scotia, The Dominion Bank, The Imperial Bank, La Banque Canadienne Nationale, and the Bank of Toronto. In the last 10 years three chartered banks have merged with other banks,

The three are, The Union, The Merchants' and The Standard. In addition to the eight chartered banks, other institutions, as stated in your text, perform the functions of chartered banks. There is also the Bank of Canada, whose chief function is to control credit.

The bank in your community performs a service for every one. The man who is on a salary and who has earnings in excess of his expenses uses the bank as a place in which to deposit his excess earnings. In this case he would likely open a *savings account* in the bank. To open a savings account he would indicate to the accountant or manager his wish, and either one of these officers would only be too glad to put him in touch with the party whose duty it is to enter a new depositor's name on the ledger, take a specimen of his signature, and provide him with a pass book.

It may be that a person may not be able to open a savings account, but is anxious to use the bank as a medium through which he may settle accounts with his creditors. In this case he would open a *current account*. Many salaried persons deposit their salary at the end of each month or two weeks, as the case may be, in the bank and then issue cheques against this account in settlement of their debts with the grocer, the butcher, etc. The current account in this case is usually depleted before the next deposit is made. When this is the case, the bank charges the depositor 5 cents for every cheque issued against the account, or sometimes they charge a flat rate of 50 cents a month. They call it an accommodation charge, because they are unable to make any money on the account, and the service they give costs them money.

Business and professional men also make use of the banks. The receipts of a day's business are usually deposited in the bank the following morning. These receipts will include bills of different denominations, silver, and cheques. The cheques may be drawn on different banks, yet they are all deposited with the depositor's own bank. When depositing them, the depositor will make out a deposit slip. The form of a deposit slip is shown on page 172.

If you have an account in the bank, you may issue a cheque against it. The form of the cheque you write is given on page 173. The form on page 173, bottom of the page, is the one you use when you are writing a cheque on your account in favor of somebody else. If you wish to write a cheque to yourself, you use the form, page 174. When you write a cheque in favor of somebody else, that somebody else must *endorse* the cheque before the bank will accept it for payment. Thus in the form page 173, Peter Gerrard would endorse the cheque by writing his name across the back of it. Note the different forms of endorsement given on page 180. Peter Gerrard would also have to put a three-cent stamp on the cheque. If he has no stamp handy, when he writes the cheque he can make it for \$24.19 instead of \$24.16, in which case the bank will put the stamp on and pay out \$24.16. If the cheque is for more than \$100, it requires a six-cent stamp.

The teacher should provide himself with a number of blank cheques and deposit slips which the pupils should be asked to fill out. The teacher would find it very helpful, too, to take his class on a visit to a nearby bank, where he could indicate to them the functions of a paying teller, receiving teller, accountant, etc.

Grade IX Literature

THE LADY OF THE LAKE

Cantos I and II have been considered in detail. Space permits only a teaching and study outline of the remaining cantos.

CANTO III (Events of the third day)

The Gathering

1. Brian the Hermit (I-VIII).

- (1) Meditation on the passing of time. When Scott wrote some were still living who could remember the Highland feuds.
- (2) Description of Loch Katrine at dawn.
- (3) The ritual preparatory to sending out the fiery cross to summon the clan.
- (4) Brian's appearance and its effect on those about him.
- (5) The circumstances of Brian's birth.
- (6) How the circumstances of his birth affected Brian's character. Give details of his character (VI-VII).

2. The Preparation of the Cross (VIII-XII).

- (1) How the cross was made.
- (2) Brian's curse—three parts increasing in severity (IX, X, XI).

3. Speeding the Cross (XII, XXV).

- (1) Malise becomes the first runner.
- (2) Malise's speed and difficulties.
- (3) The effect of the symbol on those who saw it.
- (4) Malise reaches Duncraggan.
- (5) The song of mourning (Coronach).
- (6) Malise enters the house of mourning.
- (7) The cross is taken on by Angus, son of the dead man.
- (8) Angus circles a wide territory northward and westward.
- (9) The wedding in Saint Bride.
- (10) Norman, the bridegroom, is given the task of carrying forward the cross.
- (11) Norman says farewell.
- (12) Norman's farewell song.
- (13) Norman finishes the journey of the cross. The clan streams toward the muster place.

4. Roderick Dhu (XXVI-XXXI).

- (1) (a) Roderick looks over his defenses and sends out scouts;
(b) Douglas had taken his family for shelter to a cave on Ben-venue.
- (2) Description of the cave Coir-nan-Uriskin.
- (3) Roderick lingers behind near the cave where Ellen was hidden. Roderick's bodyguard is described.
- (4) Roderick listens while Ellen sings.
- (5) Ellen's prayer for the safety of her father.
- (6) Roderick finally gives up hope of winning Ellen.
- (7) Roderick rejoins his men.

CANTO IV (Events of the fourth day)

The Prophecy

1. Malise and Norman (I-V).

- (1) Malise has been scouting and seeks Roderick.
- (2) Norman guides him to the chief. Roderick has provided for the women, children, and aged to be sheltered on the island.
- (3) Roderick sleeps apart to await a prophecy from Brian—the result of a ritual called the Taghairm.
- (4) The Taghairm described.

2. Roderick and Brian (VI-VII).

- (1) The Monk's agitation.
- (2) The prophecy.
- (3) A lowlander has unwittingly placed himself in a position to become the fulfilment of the prophecy favorable to Roderick.

3. Malise's Report to Roderick (VIII).

- (1) Lords Moray and Mar are at Doune with forces.
- (2) Roderick plans to fight the main battle in the Trosachs.

4. At the Cave (IX-XV).

- (1) The Douglas is gone. Allan-bane tries to comfort Ellen.
- (2) Ellen is to go to the convent at Cambus-Kenneth and make herself known if her father does not return before night.
- (3) Allan to comfort Ellen sings the story of Alice Brand.

Outline:

- (a) Alice and Richard in the forest—their circumstances, their former circumstances—the cause of the exile.
- (b) The anger of the elfin king—his order to Urgan the Dwarf.
- (c) Urgan before Richard and Alice—Alice's bravery.
- (d) Urgan's story of his mortal wound in a fray—his being changed to an elf—how he could be restored—Alice's bravery—her brother appears before her.

The purpose is to show Ellen that even the cruellest circumstances may end happily.

5. The Visit of Fitz-James to the Cave (XVI-XIX).

- (1) Ellen's anxiety for his safety.
- (2) Fitz-Jame's proposal to take Ellen to Stirling.
- (3) Ellen refuses and tells him of her father's exile and of her love for Malcolm.
- (4) The gift of the signet ring—Fitz-James's story of how he came by it—its powers—Fitz-James's departure.

6. The Meeting with Blanche of Devan (XX-XXVIII).

- (1) Red Murdoch's signal cry.
- (2) The meeting with Blanche—her appearance and actions—her fear of Murdoch.
- (3) The story of her sorrow told in her song.
- (4) Murdoch completes the story by telling how she had come to the highlands as a captive of Roderick.
- (5) Her trust in Fitz-James.
- (6) She warns him by her song. State the metaphor in detail in good prose.

- (7) (a) Fitz-James is convinced of Red Murdoch's treachery by:
(i) Ellen's words; (ii) Murdoch's shout; (iii) Blanche's song.
(b) Murdoch's death. How does this relate to Brian's prophecy?
(c) The death of Blanche—the lock of hair.
(d) Fitz-James's vow.

7. The Meeting with the Mountaineer (XXIX-XXXI).

- (1) Fitz-James's journey under cover of darkness.
(2) The mountaineer.
(3) Fitz-James's challenge to Roderick Dhu.
(4) Highland hospitality—food and shelter—promise to guide Fitz-James out of Highland territory—the enemies sleep together in complete trust.

CANTO V (Events of the fifth day)

The Combat

1. The Journey to Coilantogle Ford (I-XIV).

- (1) Introductory—admiration of faith and courtesy between enemies. Put simile in good prose.
(2) The country along the route.
(3) The highlander questions Fitz-James as to his reason for coming in those regions without a pass from Roderick Dhu.
(4) Fitz-James's joking reply: (a) He thought the country at peace; (b) He might be just idly wandering—perhaps after a falcon which has flown, perhaps to seek a mountain maid, perhaps because of the lure of danger.
(5) (a) Questions regarding the King's preparation for war.
(b) Why is Fitz-James the sworn foe of Roderick?
(c) Fitz-James's condemnation of Roderick.
(6) The Highlander's justification of his chieftain.
(7) Justification of Highland plundering.
(8) Fitz-James repeats his vow against Roderick.
(a) His life had been plotted against; (b) He has made a vow; (c) He will come again with armed force; (d) He expresses his desire to have Roderick and his men before him.
(9) His wish is fulfilled.
(a) Describe the appearance of the host.
(b) The unknown Highlander reveals himself as Roderick Dhu.
(10) The disappearance of the host.
(11) The journey continued.
(a) Roderick repeats his pledge to guide him to Coilantogle Ford; (b) Fitz-James is uneasy.
(12) Coilantogle reached.
(a) The pledge kept; (b) the challenge to a duel.
(13) Fitz-James appreciates the Highlander's hospitality.
(a) He tries to make peace; (b) Roderick tells him of the prophecy; (c) Fitz-James replied by telling of the slaying of Red Murdoch; (d) He pleads with Roderick to seek reconciliation with the king and guarantees safe return to his territory if a reconciliation is not brought about.

- (14) Roderick's anger at the suggestion of Fitz-James.
(a) His clansman's blood calls for revenge.
(b) He taunts Fitz-James with cowardice.
(c) Fitz-James shows him that he too could call men to his aid.

2. The Duel (XV-XVII).

- (1) The methods of fighting of the two combatants—Roderick trained with the broadsword and shield; Fitz-James trained as an expert swordsman who did not need a shield.
(2) Roderick three times wounded.
(3) Roderick disarmed and brought to his knee.
(4) Roderick's advantage.
(a) Fitz-James calls upon him to yield.
(b) Roderick rushes upon him and, in spite of a new wound, wrestles with him.
(c) Fitz-James is thrown, and Roderick raises his dagger to strike, but faints from loss of blood.
(5) Fitz-James keeps his pledge to Blanche.
(a) The braid is dipped in Roderick's blood.
(b) He blows a signal to his squire.
(c) Roderick is placed on the horse intended for Ellen.

3. The Journey to Stirling (XVIII-XIX).

- (1) A swift journey to Stirling. Note on your map the places passed.
(2) Fitz-James recognizes Douglas in the disguise of a woodsman.

4. The Sports at Stirling (XX-XXV).

- (1) Douglas's thoughts as he approaches Stirling.
(a) Malcolm Graeme is a prisoner and Roderick is in danger.
(b) He is going to give himself up to save Roderick.
(c) Ellen will be cared for at the Abbey.
(d) Stirling Castle contains a dungeon, block, and nameless tomb for him.
(e) The Douglas hears the ringing of bells and sees the people crowding the streets in holiday attire. This is sports day, and Douglas knows King James will be there.
(f) He resolves to take part in the sports.
(2) The King mingles among the people. Note his popularity. Note also that there were those present who disliked the King. Why did they dislike him?
(3) The archery contest. Tell the story of this, making it as vivid as possible. What was the prize?
(4) The wrestling match and hurling the weight. Tell the story, making it as vivid as possible. What was the prize? What did Douglas do with it?
(5) Douglas is recognized by the people.
(6) The mimic chase. Describe this vividly. Note the climax—Douglas strikes the groom.

5. Douglas is Made a Prisoner (XXVI-XXXIII).

- (1) His arrest.
(a) The King's guard threatens Douglas.
(b) He shouts his name and addresses the King.
(c) The King expresses his former love for Douglas, but orders his arrest.
(d) The sports of the crowd.

- (2) The attitude of the crowd.
 - (a) They resent the treatment of Douglas.
 - (b) Describe the scene of confusion.
 - (c) Douglas requests the privilege of addressing the people.
- (3) Douglas pleads for order. He does not wish to think that sorrow has been caused by his presence as a prisoner.
- (4) The crowd becomes quiet. Douglas's attitude softens the hearts of everyone.
- (5) The King recognizes the fickleness of the crowd and is saddened by it.
- (6) A messenger arrives to tell of an impending battle between the royal forces and those of Roderick Dhu.
- (7) He sends the messenger back to forbid Lords Mar and Moray to attack, since Roderick and Douglas are both prisoners.
- (8) Night closes upon a saddened town. Rumors come of a fight upon the shores of Loch Katrine.

CANTO VI (Events of the sixth day) The Guard-Room

1. **Introduction.**—Thoughts of the varied scenes of sorrow and suffering looked upon by the rising sun.
2. **The Military Scene (II-V).**
 - (1) The changing of the guard.
 - (2) The scene of debauchery.
 - (3) The mercenary (professional) soldiery—their various countries of origin.
 - (4) Their talk, the wounded about, indicate the battle which was being fought.
 - (5) The rough John of Brent sings a song.
3. **The Arrival of Ellen (VI-X).**
 - (1) Ellen and Allan-bane arrive at the guard-room. They are guided by an old soldier. The soldiers joke roughly about them.
 - (2) John of Brent offers insult to Ellen but is restrained by Ellen's courage.
 - (3) De Brent shows his good qualities and warns his comrades to respect Ellen.
 - (4) The Captain arrives. He is inclined to treat Ellen with disrespect. Ellen presents the ring.
 - (5) The Captain recognizes the signet of the King, and apologizes for his actions. Note Ellen's generosity and humble spirit.
4. **Allan-bane Visits Roderick (XI-XXII).**
 - (1) Allan-bane craves to see his master.
 - (2) He is led by mistake to Roderick.
 - (3) Roderick's weakness. His anxiety to learn of Ellen, the clan, his mother, and Douglas. Allan-bane comforts him.
 - (4) Roderick asks for the story of the battle.
5. **The Battle of Beal An'Duine (XV-XXII).**

Old Allan-bane sings the story of the battle as he saw it. The following is a topical outline:

 - (1) The viewpoint.
 - (2) The battle array of the King's army.
 - (3) The clash within the Trosachs and the retreat of the King's army.

- (4) The King's army again advances. Clan-Alpine needs its leader, Roderick Dhu.
- (5) The battle comes near Loch Katrine.
- (6) Moray's plan to take the isle. The Saxon swimmer is killed by Duncraggan's widow.
- (7) A messenger arrives and waves a flag of truce. The story of Roderick's capture is told and the battle is ended. As Allan-bane finishes his story Roderick breathes his last. The minstrel sings a dirge in honor of Roderick.

6. Ellen Meets the King (XXIII-XXIX).

- (1) Musing in her apartment, Ellen hears Malcolm singing.
- (2) Give the central thought of the *Lay of the Imprisoned Huntsman*.
- (3) The Knight of Snowdon comes to take Ellen to the King.
- (4) The Knight of Snowdon is revealed as the King of Scotland.
- (5) With Douglas forgiven and Roderick dead, Ellen hesitates to pray for Malcolm.
- (6) Ellen gives Douglas the ring and is informed that it has lost its power.
- (7) Malcolm is called and the King forgives him and sanctions his engagement to Ellen.

Problems

1. Relate the story of the ring. You may use the following outline:
 1. Fitz-James's Visit to Ellen in the Cave.
 - (1) His proposal. (2) The gift of the ring. (3) Its powers.
 2. Ellen meets the King.
 - (1) At the guard-room. (2) Her first desire—not expressed
 - (3) Her second desire—not expressed (4) How she lost the right to make a request.
2. Write a paragraph descriptive of a Lake at Sunrise. Use part II of Canto III as a model.
3. Describe the ritual which preceded the gathering of the clan.
4. Write an account of the Taghairm (Parts V and VI of Canto IV).
5. Relate the story of the gathering of the clan.
6. Relate the story of Alice Brand.
7. Relate the story of Blanche of Devan using the following outline:
 - (1) The meeting with James Fitz-James.
 - (2) The story of her life as told by herself and Red Murdoch.
 - (3) Her warning to Fitz-James.
 - (4) Her death.
8. Write a paragraph on Highland hospitality drawing your illustrations from: (a) Fitz-James's first visit to the island; (b) Roderick's care of Ellen and Douglas; (c) Fitz-James's meeting with the Highland watchman.
9. Tell the story of the duel.
10. Discuss the character of Roderick under the headings: cruelty, courage, kindness, loyalty, devotion to Ellen.
11. Relate the story of the sports day at Stirling.
12. Relate the story of the Battle of Beal An'Duine.

Science Tests

Grade IX

- Make a numbered list of the words or phrases necessary to complete each of the following statements correctly.
 - Light passes freely in straight lines through (1)..... bodies but is stopped by (2)..... bodies.
 - The velocity of light is (3)..... miles per second.
 - Light travels by means of (4)..... in straight lines known as (5).....
 - The partial shadow of the earth which falls on the moon at beginning of an eclipse is called (6).....
 - The first law of reflection of light is (7).....
 - The second law of reflection of light is (8).....
 - When light passes from one optical medium to another of different optical density it is (9).....
 - A fish under the surface of water appears to be (10)..... than it really is.
 - When light passes through a prism it is broken up into a band of colors called the (11).....
 - The colors in their correct order found in such a band are (12).....
 - A red object appears red in a white light because (13).....
 - A blue object appears (14)..... in a yellow light because (15).....
- Draw a correctly labelled diagram to show the formation of a spectrum.
 - Show by a correctly labelled diagram how a pinhole camera forms an image of a lighted candle placed before it.

Answers: 1. (1) transparent, (2) opaque, (3) 186,000, (4) waves, (5) rays, (6) penumbra, (7) the image is as far behind the mirror as the object is in front of it, (8) the angle of incidence is equal to the angle of reflection, (9) refracted or bent, (10) closer to the surface, (11) spectrum, (12) red orange yellow green blue indigo and violet, (13) it absorbs all colors but red which it reflects to the eye, (14) black, (15) it absorbs all colors except blue. There being no blue in yellow light no color is reflected to the eye, hence object appears to be black.

Grade X

- What is Javelle water?
 - How might tea stains be removed from a white tablecloth?
 - Why should one always use gasoline outside when cleaning?
- Complete the following table regarding chemicals commonly used in the home.

Chemical	How Made or Chemical Name	Use
Household Ammonia.....		
Baking Soda.....		
Baking Powder.....		
Gasoline.....		
Soap.....		
Vinegar.....		
Chloride of Lime.....		
Lye.....		

Grade X Written Language

General Composition

Review what was said about punctuation in the last three numbers of this magazine and study carefully the following additional rules and exercises:

Rule 17. Quotation marks (".....") are used to enclose the direct words of a speaker; e.g.,

(1) Tyler said to the Mayor, "What have I said to displease thee?"

(2) "Yes, truly," quoth the Mayor, "thou false Knave, shalt thou speak thus in the presence of the King?"

Quotation marks may be likened to "go" and "stop" signs. The first set of double commas indicates the start of the speech; the second set indicates the stop in the speech. Sometimes we may continue for many sentences before reaching the end of the speech and the second set of double commas (inverted). Sometimes a break occurs; then we need a "stop" sign and another "go" sign as in sentence (2) above.

When writing conversation, the words of the different speakers are indicated by separate sets of quotation marks. The different speeches also form separate paragraphs.

Exercise

Supply all punctuation, commas, semicolons, quotation marks, dashes, needed in the following passage. Do not put in unnecessary marks:—

By little and little he got tired of the bustle of the day the noise of carriages and carts and people passing and repassing and would fall asleep or be troubled with a restless and uneasy sense again the child could hardly tell whether this were in his sleeping or his waking moments of that rushing river.

Why will it never stop Floy he would sometimes ask her. It is bearing me away I think!

But Floy could always soothe and reassure him and it was his daily delight to make her lay her head down on his pillow and take some rest.

You are always watching me Floy. Let me watch you now! They would prop him up with cushions in a corner of his bed and there he would recline the while she lay beside him bending forward oftentimes to kiss her and whispering to those who were near that she was tired and how she had sat up so many nights beside him.

Rule 18. The hyphen (-) is used to join words which together act as a single part of speech; e.g., the *dewy-feathered* sleep.

The two words *dewy* and *feathered* are joined because together they act as a single adjective.

Some words are so closely compounded that hyphens are not used; e.g., however, nevertheless.

Rule 19. The hyphen is used at the end of a line to indicate that the word is broken and is carried on to the next line. Look for examples in the pages of this magazine.

The break always occurs between syllables. Careful pronunciation is the best means of determining where the syllables should divide.

Exercise

1. Place hyphens where necessary in the following expressions. Do not use a hyphen if usage does not require it. When in doubt, consult a good dictionary.

- (1) In the old, old, half forgotten times.
- (2) Nowadays there are no such hydra headed monsters.
- (3) He was web footed and web fingered after the fashion of a duck.
- (4) Then the stag became a fluttering sea bird.
- (5) Cut throats were common in Mediaeval forests of Germany.
- (6) Half grown; milk pails; cart horses; swine shaped jaws; cross-bow; bloodshot; the early rising sun; knapsack; a horrid looking creature; a well lighted hall; tea cups; eyes as large as mill wheels; tinder box; gentleman; watercress; my hard hearted enemy; breakfast room; bed chamber; all the world is great coated and buttoned up; mud flakes; cake men sell cakes; pastry cook; playgoers; mail coach; night shirt.

Rule 20. Italics, a slanted form of type, are used to:

(1) Emphasize a passage; e.g., We do not propose to *disestablish the present committees*.

(2) Indicate the title of a book, or article, when such a title is mentioned in a sentence; e.g., I have read *The Tale of Two Cities*.

(3) Indicate a foreign expression; e.g., He was filled with the *joie de vivre*.

Italics cannot be indicated by handwriting. To show the expression to be italicized, underline it with a single line. When articles are to be printed other forms of type are used to set off titles, subtitles, etc. Thus a double line drawn under an expression indicates black face type; a triple line indicates all capital letters. Look for examples of different forms of type in this magazine and determine the reason for each form.

Exercise

1. Explain why italics are used in each of the following:

- (1) *The Forsyte Saga* was written by John Galsworthy.
- (2) We have changed our *tempo*, or speed in speaking.
- (3) The *a* of *dancing* is a different sound in South England from that given by Canadians.
- (4) It is well you escaped being dashed in pieces by that mountain.—

Bunyan: *The Pilgrim's Progress*.

- (5) He rushed back to the *melee*.

Coherence in Sentences

In the article on Grade X Written Language in the last number of this magazine, we made some observations on *unity* and *coherence*

in paragraphs. (Review that section). Paragraphs cannot be coherent unless the sentences are unified and coherent. Most cases of lack of coherence are due to faulty order of words, phrases, or clauses.

In each of the following improve the clearness of the sentence by changing the order of the parts or by rewriting the sentence. In each case write clearly in a single sentence why you made the change.

1. The courtliest Knight thou art, and meekest unto all ladies and gentlewomen, that now liveth.

2. He entered the castle, in the midst of the forest, which contained a fair, green court.

3. Much wealth was found on the island, of silver and gold.

4. He escaped from the tower with the help of a sheet, which was large enough to let him pass through.

5. There was a cabin on the edge of the lake, out of which came three hunters heavily loaded with supplies.

6. He arose early and left the castle where he had been lodged, on his horse.

7. She began to carefully lay her plans.

8. The girls are unable to properly do their exercises.

9. Other species seem to much dislike wet weather.

10. A very interesting incident began to persistently occupy our attention.

11. How far the storm extended it would be difficult to correctly and truthfully say.

12. When an inflated balloon is released it begins to at once rise from the ground.

Argument

In our last number we made some observations on exposition. Argument is only a form of exposition. We endeavor to prove the truth or falsity of a statement by supplying sufficient facts to convince our hearers of our assertion. The argument consists, then, of three main parts: statement of proposition, body of proof, and conclusion.

Exercise

Prove any five of the following propositions.

1. Every school should have an adequate library.

2. Schools in Saskatchewan should be equipped for indoor games in winter.

3. Elementary school subjects and high school subjects should not be taught in the same classroom.

4. Reading is the most profitable recreation.

5. Honesty is the best policy.

6. War is the greatest of human evils.

7. Falsehood never profits a man.

8. Country life has many advantages over city life.

9. Laws are a necessity to human welfare.

10. Good handwriting is a valuable achievement.

11. When we attempt to prove the falsity of a statement we are said to refute the statement (Refutation).

Refute one of the following:

- (1) All men should retire from active work at the age of fifty.
- (2) Bargain sales are harmful to merchants and public alike.
- (3) A nation's wealth depends on the amount of gold within its borders.

Narrative (Vividness)

Note the following extract from a story by Charles Dickens:

One night he had been thinking of his mother, and her picture in the drawing-room downstairs, and had thought she must have loved sweet Florence better than his father did, to have held her in her arms when she felt that she was dying—for even he, her brother, who had such dear love for her, could have no greater wish than that. The train of thought suggested to him to enquire if he had ever seen his mother? for he could not remember whether they had told his yes, or no, the river running very fast and confusing his mind.

"Floy, did I ever see Mamma?"

"No, darling. Why?"

"Did I never see any kind face, like Mamma's, looking at me when I was a baby, Floy?"

He asked incredulously, as if he had some vision of a face before him.

"Oh yes, dear!"

"Whose, Floy!"

"Your old nurse's. Often."

"And where is my old nurse?" said Paul. "Is she dead too? Floy, are we *all* dead, except you?"

There was a hurry in the room for an instant—longer, perhaps; but it seemed no more—then all was still again; and Florence, with her face quite colourless, but smiling, held his head upon her arm. Her arm trembled very much.

"Show me that old nurse, Floy, if you please!"

"She is not here, darling. She shall come tomorrow."

"Thank you, Floy!"

Paul closed his eyes with these words, and fell asleep.

Note.—Conversation in narrative aids interest because: (1) it is a natural form of expression; (2) the characters are more real when they speak; (3) their manner of speaking reveals their feelings.

Exercises

The following are summaries of anecdotes (very brief stories). Make each one more interesting by re-writing it, using direct speech (conversation).

1. Two ladies were calling on Mrs. Brown. During the afternoon the hostess absented herself for a few minutes, and in the interval her small daughter came in. After greeting the child, one visitor turned to the other and said that the child was not very pretty. Before the other visitor could reply young Mary spoke up and said pertly that maybe she was not pretty but that she was fairly smart.

Grade X Literature

JULIUS CAESAR, Act III

Before accomplishing the death of Caesar in this third act, Shakespeare has prepared the audience for his death. He has created a sentiment opposed to Caesar through the medium of:

- (1) Cassius' arguments to Brutus.
- (2) Casca's story of the offering of a crown to Caesar.
- (3) Caesar's desire for an heir.
- (4) Caesar's fear of Cassius as expressed to Antony.
- (5) Caesar's arrogance as exhibited in his manner to the Soothsayer and his conversation with Decius Brutus concerning attendance at the senate.

The dramatist, too, has heightened the interest of the audience as the action leads up to the assassination by:

- (1) The repeated warning of the Soothsayer:
(Caes.) "The Ides of March are come".
(Soothsayer) "Ay, Caesar, but not gone".
- (2) The nervousness of Portia.
- (3) The introduction of Artemidorus with a letter of warning to Caesar.
- (4) Stage effects which harmonize with tragedy—thunder and lightning, tales of supernatural happenings.
- (5) Creation of suspense through delays of both the conspirators and Caesar.
- (6) The nervousness of the conspirators who fear prevention.

We shall consider the act under three headings: the assassination of Caesar, the influence of Brutus and Antony on the distracted people, the unreasonableness of an inflamed mob.

Scene I. The Assassination.

1.—Note the nervousness of the conspirators lest they be prevented in their purposes. Popilius Lena has evidently learned something of the conspiracy, as had Artemidorus. The interest of the audience is further heightened by suspense. "Will Caesar be warned?"

Notice that for once Brutus shows himself superior in generalship to Cassius. Popilius, in wishing that Cassius' enterprise might thrive, reveals that the conspiracy has leaked out. He is immediately in a panic and bids Casca be sudden, but Brutus remains calm and watches Caesar's reactions when Popilius speaks to him. His countenance does not change, so Brutus is able to assure Cassius that Popilius has not warned Caesar. Calmness is a characteristic of Brutus; Cassius is excitable. Note other evidences of this in the play.

- 2.—The method of attack had been well-planned. Note the steps:
 - (1) Metellus had been chosen to present a petition Caesar was not likely to grant.
 - (2) Trebonius had been appointed to engage the attention of Antony.

(3) The others press around Caesar as if to plead for the pardon of Metullus' brother.

(4) Casca had been chosen to strike the first blow.

Note how very arrogant, unbearably so, are Caesar's references to himself, how self-centred and imperial. The dramatist has put the audience in a mood to condone Caesar's death.

3.—The great friendship of Caesar for Brutus is here shown, and the ground prepared for a condemnation of his deed. Caesar ceases to struggle when he sees Brutus among the assassins.

4.—Picture the confusion of the crowd and the excitement of the conspirators when the deed had been accomplished. Note the irony of their shouts of "Peace, freedom, and liberty!" while waving on high their blood-stained swords which are symbols of violence, force, and slavery.

5.—Antony's message promises his friendship to Brutus on condition he can be shown why Caesar deserved his death.

6.—Note that as Antony comes upon the scene he pays no attention to Brutus and Cassius until he has bemoaned the death of Caesar:

"O mighty Caesar! dost thou lie so low?
Are all thy conquests, glories, triumphs, spoils,
Shrunk to this little measure?"

7.—Brutus places the assassination on a high level of morality—"pity to the general wrong of Rome". He expresses friendship for Antony. Note that the shrewd Cassius tried to appeal to him on the grounds of material advantage. Brutus has acted from lofty motives; Cassius from selfish motives. Here is an essential difference between the two men.

8.—Antony gives his hand to each of the leading conspirators in turn as a token of friendship. Its insincerity is shown by his words addressed to the dead body of Caesar.

9.—Antony asks and is granted permission to deliver an oration in honor of Caesar. Cassius opposes this move, but Brutus overrules. Again Brutus has made a grave error of judgment for which Cassius later is able to taunt him. Brutus has such confidence that the people are with him that he is sure anything Antony may say will have no harmful effect if he speaks first.

10.—Antony in a soliloquy over Caesar's body reveals his true purposes. He pays tribute to Caesar as having been the "noblest man that ever lived in the tide of times". Then he indicates that Caesar's death will be avenged by civil war.

11.—Octavius, Caesar's nephew and foster son, is introduced in the play. Henceforth these two will be allies to punish Brutus and Cassius.

Scene II.—The Influence of Brutus and Antony on the People

In this scene we reach the crisis of the play. Up to the time Antony began his address the fortunes of the conspirators had been forwarded. They had been successful in all they had planned. As Antony's speech progressed the mob began to turn against the conspirators. From then on their fortunes declined and the action moves toward a triumph of Caesar's spirit as represented in the attitude of the people toward him. His influence lives on, strong enough to defeat his enemies.

Brutus' Speech

1. Note that Brutus does not present argument to show that Caesar deserved death. He relies solely on the high opinion Romans hold of him to cause them to accept the truth of his statements that Caesar was ambitious for power which would destroy the freedom of the Roman people, and that he therefore deserved death.

2. He appeals to them to have regard for his honour.

3. He states his great love for Caesar but his greater love for Rome.

4. He suggests that Caesar would take away their freedom.

5. He recognizes and pays tribute to the good in Caesar, his love, his success, his valour, but he hates his ambition.

6. He appeals to their love of personal freedom, pride in their city, and love of country.

The appeal is wholly emotional. Note the fine oratorical effect gained by the use of questions. Note the increasing strength (climax) of the closing sentences of this part of his speech. He speaks first of personal considerations, then the wider considerations of city, and finally of country.

7. Brutus has gained the favour of the mob. He closes with the statement that the reason for his death has been enrolled in the Capitol. Nothing has been said to take away from his worth, nor has anything been said to enlarge upon his offences.

8. As Mark Antony enters upon the scene Brutus expresses the noble sentiment that as he slew Caesar for the good of Rome so he would slay himself if his country needed his death. This statement is prophetic, for Rome eventually turned against Brutus and circumstances caused him to commit suicide.

Note the effect of Brutus's speech on the mob. Their actions show that Brutus has erred. He has mistaken the mind of the Roman people. He thought the Roman people desired a Republic but their words and actions indicate that they desired a strong hand like that of Caesar. "Let him be Caesar". The crowd was entirely willing to raise another to the power of Caesar. As Brutus leaves he urges the people to listen to Antony pay tribute to Caesar's glories.

Antony's Speech

As Antony mounts to the rostrum the remarks of the crowd indicate that he has an audience favourable to Brutus and believing that Caesar was a tyrant.

1. He must gain the sympathy of the crowd so he is careful to say nothing immediately against Brutus. His use of the word *honourable* is meant to build into their minds the idea that Brutus was not the honourable man they thought him, but he does not use it in this first part with any tone of sarcasm. He proceeds in such a way as to have the crowd gradually reach the conviction that they have suffered a great wrong, through the agency of Brutus and his party.

2. Brutus's main charge was that Caesar was ambitious. Antony proceeds to refute this statement. He presents definite argument to show that Caesar was not selfishly ambitious but on the contrary he worked always for the good of Rome:

- (1) He had enriched Rome by his conquests.
- (2) He had sympathized with the poor.
- (3) The charge of ambition is definitely disproved by the fact that he had refused the crown when it was thrice offered him on the occasion of the Lupercalia.

Note.—The feast of Lupercal (Lupercalia) was the most sacred of Roman holidays. It commemorated the founding of Rome.

3. With his arguments established Antony now confines himself to emotional appeal.

(1) He breaks down and weeps. This has its effect on the crowd. They begin to feel with Antony and to consider the weight of his arguments.

(2) Antony now sows in their minds the seeds of mutiny. He suggests that for him to counsel mutiny would do wrong to Brutus and the others who had killed Caesar. Now a tinge of sarcasm enters into his use of the word *honourable*. He would not wrong such *honourable* men, but would rather wrong the dead, himself, and the people. He could not have chosen more effective words for his purpose. To wrong the dead and himself is one thing, but for them to be wronged is another matter. The appeal is to selfish interests.

(3) He strengthens the appeal to selfish interests. Caesar was their benefactor. He mentions the will and makes the most of it to excite action.

(4) He inflames them by refusing to read the will professing that he does not want the mutiny which is sure to follow.

(5) He prepares to read the will but first he plays upon their emotions by showing Caesar's wounded body.

(6) He recalls Caesar's victories which had brought greatness to Rome.

(7) He places the responsibility for the wounds by naming Brutus, Cassius, and Casca.

(8) He now uses freely such words as *ingratitude*, *traitors*, *bloody treason*.

(9) The people are inflamed and ready to mutiny.

(10) He suggests mutiny more plainly and reads the will, a final appeal to their selfish interests.

(11) His purpose is attained. Mutiny is afoot.

This passage by Shakespeare is said to be the most eloquent bit of literature in the English language. Note these points of eloquence:

- (1) The play on emotions.
- (2) The vividness of the language.
- (3) The concreteness of his statements.
- (4) The fervour and apparent sincerity of his words.
- (5) The gradually increasing strength of his appeal beginning with reasoned argument and proceeding to suggestion of wrong done, suggested mutiny, the showing of Caesar's body, open condemnation of Brutus and the others, and finally the reading of the will.

Scene III.—The Mob at Work

The purpose of this scene is to show the temper of the crowd—the working of the mob spirit. Cinna, the poet, is innocent of any wrongdoing, yet the inflamed and unthinking mob kill him.

Assignments

1. Memorize the passage, lines 170-197.
 2. Write a prose summary of Brutus's speech.
 3. Write a similar summary of Antony's speech.
 4. Write a paragraph giving your impressions of the mob.
 5. Write in a sentence or two the purpose Antony had in mind when delivering the speech.
 6. Show how an incident which occurred during Brutus's speech indicated that Brutus had erred in judgment concerning the wishes of the Roman people.
 7. Describe the assassination of Caesar, using the following outline:
 - (1) Caesar and his party reach the Senate.
 - (2) Petitions are presented—the petition of Metullus.
 - (3) The part taken by other conspirators.
 - (4) The death of Caesar.
 - (5) The bewilderment of the crowd.
-

GRADE IX ARITHMETIC

Continued from page 8

Bank Interest

Note the reasons listed on page 175 as to why a person should deposit money in a bank. Chartered banks today pay 2% interest on savings deposits. Note particularly, too, how the bank calculates the interest to be credited to a depositor's account on June 30 and December 31 of each year. Thus in the list of deposits and balances given on page 176, what is the *minimum monthly balance* for the month of May? On a superficial examination you would say it was \$204.60. But this would not be correct. The correct answer is found by inquiring what the balance is on May 7.

Now do questions 1-4, page 177.

Clearing-House

In all large cities there are several banks doing business. Each bank has clients or persons and businesses that do business with it. In the course of a day's business one bank will receive many notes and cheques drawn on some other bank. Thus A has an account in the Dominion Bank. He gives his cheque for \$10 on this account in the Dominion Bank to B, who does business with the Royal Bank. B cashes the cheque in the Royal Bank. It is clear that A's account in the Dominion Bank must reimburse the Royal Bank for the \$10 that it paid to B. After a day's business, each bank will have many such notes and cheques drawn on accounts in other banks. These notes and cheques are restored to the proper banks through means of a clearing-house, where representatives of all the banks in a community meet and exchange cheques and notes.

Grade XI Algebra

QUADRATIC SURDS

Numbers such as 16, 25, 49, etc. have exact square roots such as 4, 5, 7, etc. Other numbers such as 5, 13, 15, etc. have no exact square roots. If we wish to speak of the square roots of these numbers, we express them as $\sqrt{5}$, $\sqrt{13}$, and $\sqrt{15}$. Numbers expressed in this way are called surds. Since we are seeking the *square* roots of the numbers, we call them *quadratic surds*.

The pupil should be very clear in his mind on just what a surd is. We know that the square root of 16 is 4, therefore, 4 multiplied by 4 gives 16. Similarly, the square root of 5 is $\sqrt{5}$, therefore, $\sqrt{5}$ multiplied by the $\sqrt{5}$ gives 5. Similarly also $\sqrt{3} \times \sqrt{3} = 3$ and $\sqrt{7} \times \sqrt{7} = 7$. The pupil should drill himself well on this point.

Since the $\sqrt{49} = 7$, then $\sqrt{7} \times \sqrt{7} = \sqrt{49}$. Similarly $\sqrt{3} \times \sqrt{5}$ should equal $\sqrt{15}$, and it does because we can prove that $(\sqrt{15})^2 = (\sqrt{3} \times \sqrt{5})^2$. $(\sqrt{15})^2 = \sqrt{15} \times \sqrt{15} = 15$ and $(\sqrt{3} \times \sqrt{5})^2 = \sqrt{3} \times \sqrt{3} \times \sqrt{5} \times \sqrt{5} = 3 \times 5 = 15$. A number such as $3\sqrt{5}$ is called a mixed surd because it is made up of two factors, a *rational* factor and a surd factor. The 3 is the rational factor. There is, of course, a multiplication sign understood between the 3 and $\sqrt{5}$. When the number is written as $\sqrt{5}$, 1 is understood as a rational factor. Numbers such as $3\sqrt{5}$, $\sqrt{5}$, and $7\sqrt{5}$ are called *like* surds, because the quantities under the surd sign are the same. They resemble like terms, like $3a$, a , and $7a$. Hence we can add them. Thus $3\sqrt{5} + \sqrt{5} + 7\sqrt{5} = 11\sqrt{5}$.

Numbers like $\sqrt{3}$, $3\sqrt{5}$, and $\sqrt{7}$ are called *unlike* surds, because the quantities under the surd sign are different. They resemble the unlike terms b , $3c$, and d . We cannot add them. Now we multiply together like surds by removing the surd sign. Thus $\sqrt{6} \times \sqrt{6} = 6$ and $3\sqrt{5} \times \sqrt{5} = 3 \times \sqrt{5} \times \sqrt{5} = 3 \times 5 = 15$; also $3\sqrt{7} \times 4\sqrt{7} = 3 \times 4 \times \sqrt{7} \times \sqrt{7} = 12 \times 7 = 84$. We multiply together unlike surds by putting their product under a single surd sign. Thus $\sqrt{7} \times \sqrt{3} = \sqrt{21}$. So also $3\sqrt{5} \times 4\sqrt{6} = 3 \times 4 \times \sqrt{5} \times \sqrt{6} = 12\sqrt{30}$.

When the rational factor is unity we say the surd is an *entire* surd. $\sqrt{50}$ is an entire surd, so is the $\sqrt{10}$. Now sometimes an entire surd may be changed to a mixed surd. This is possible when the number under the surd sign contains a square factor. By square factors we mean numbers like the following: 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144. Since $50 = 25 \times 2$, we see that the square factor in 50 is 25. Hence we say that

$$\begin{aligned}\sqrt{50} &= \sqrt{(25 \times 2)} = \sqrt{25} \times \sqrt{2} = 5 \times \sqrt{2} = 5\sqrt{2} \\ \sqrt{56} &= \sqrt{(4 \times 14)} = \sqrt{4} \times \sqrt{14} = 2 \times \sqrt{14} = 2\sqrt{14} \\ \sqrt{80} &= \sqrt{(16 \times 5)} = \sqrt{16} \times \sqrt{5} = 4 \times \sqrt{5} = 4\sqrt{5} \\ \sqrt{200} &= \sqrt{(100 \times 2)} = \sqrt{100} \times \sqrt{2} = 10 \times \sqrt{2} = 10\sqrt{2}\end{aligned}$$

Note that in each case in the above the entire surd contained a square factor. The student should memorize the square factors up to at least 144. When a number contains two square factors, we should

always pick the larger. Thus in $\sqrt{128}$, the number 128 contains the square factor 4, the square factor 16, and the square factor 64. Hence we remove the factor 64. $\therefore \sqrt{128} = \sqrt{(64 \times 2)} = 8\sqrt{2}$ $\sqrt{405} = 9\sqrt{5}$. Conversely, we can change a mixed surd to an entire surd by squaring the rational factor, multiplying the result by the surd factor, and placing the number thus obtained under the surd sign. Thus $3\sqrt{5} = \sqrt{(3 \times 3 \times 5)} = \sqrt{45}$, and $7\sqrt{6} = \sqrt{(49 \times 6)} = \sqrt{294}$. Now do questions 1-37, page 231.

A number may be a mixed surd with the surd factor containing a square factor. Thus in $4\sqrt{20}$, the surd factor $\sqrt{20}$ contains the square 4. Hence when we remove this square factor by taking its square root, we must multiply the square root by the rational factor. Thus $4\sqrt{20} = 4 \times 2\sqrt{5} = 8\sqrt{5}$. Now do questions 1-29, page 232.

Conjugate Surds

Surd expressions like $\sqrt{3} + \sqrt{2}$ and $\sqrt{3} - \sqrt{2}$ are said to be conjugate. Note that the expressions are the sum of $\sqrt{3}$ and $\sqrt{2}$ and the difference of $\sqrt{3}$ and $\sqrt{2}$. The product of the sum and difference of the same two quantities, as we saw earlier in our work, is the difference of their squares. Thus $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2}) = (\sqrt{3})^2 - (\sqrt{2})^2 = 3 - 2 = 1$. We can verify this by multiplying as follows:

$$\begin{array}{r} \sqrt{3} + \sqrt{2} \\ \sqrt{3} - \sqrt{2} \\ \hline 3 + \sqrt{6} \\ -\sqrt{6} - 2 \\ \hline 3 - 2 = 1 \end{array}$$

Similarly $(\sqrt{7} + 2\sqrt{5})(\sqrt{7} - 2\sqrt{5}) = (\sqrt{7})^2 - (2\sqrt{5})^2 = 7 - 20 = -13$. We thus note that when we multiply together two conjugate surds the result is rational. We make use of this fact when we come to division of surds. First, however, do questions 1-40, page 235.

Division of Surds

To find the value of $2/\sqrt{3}$, we may proceed by taking the approximate value of $\sqrt{3}$ as 1.7321 and dividing this by long division into 2. The student should perform the long division in this case, as then he will better appreciate the shorter method of doing the same problem. The shorter method is based on the principle that you do not change the value of a fraction by multiplying the numerator and denominator by the same quantity. Thus,

$$\frac{2}{\sqrt{3}} = \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3} = \frac{2 \times 1.7321}{3} = \frac{3.4642}{3} = 1.1547$$

We thus see that by making the denominator a rational quantity, we avoid a rather complicated long division.

Again, if asked to find the value of $2/7 - 4\sqrt{3}$, we could proceed as follows:

$$\frac{2}{7 - 4\sqrt{3}} = \frac{2}{7 - 4 \times 1.7321} = \frac{2}{7 - 6.9284} = \frac{2}{.1716}$$

But this method, as we see, involves dividing .1716 into 2 by long divi-

Grade XI Physics

MUSICAL SOUNDS

1.—Noise vs. Musical Sounds. When one drops a dish on the floor, strikes a blow with a hammer, or slams a door, the resultant sound is recognized as a noise. It is disagreeable to one's ear. On the other hand when one plucks a guitar string, strikes a piano key, or blows gently on an organ pipe the resultant sound is a musical note. It is pleasing to the ear. The difference between such sounds may be observed if their resultant wave trains are shown on a screen by some form of phonodeik as is shown in Fig. 454, text. It is found that the noise makes a very irregular and haphazard curve, while in the case of the musical tone the curve is uniform and periodic. One may thus say, "*that a musical note arises from rapid, periodic vibrations.*"

2.—The Three Characteristics of a Musical Note. It is quite easy to distinguish the type of instrument which is playing a given note. This is due to the characteristics of the sound wave produced. These characteristics are known as intensity or loudness, pitch, and quality or timbre.

3.—Intensity or Loudness. It was shown in last month's lesson that loudness of a sound diminished as the distance from the source of sound increased. It may now be stated that for an ear in a given position the intensity of sound depends on the energy of the vibrating body, or which is the same thing, on the amplitude of vibration of the sound waves. This simply means that an instrument gives a louder sound when bowed or blown hard, than when operated gently.

4.—Pitch. By the characteristic pitch one means that feature of a note which enables one to say whether or not it is high. By holding a card against the teeth of a revolving wheel while changing the speed of rotation of the wheel we easily recognize the fact *that the pitch of a given note depends on the number of vibrations per second*. The pitch or number of vibrations per second made by a given note is often determined in this way. A siren disc (a circular metal plate with a row of equally spaced holes bored around the outside edge) is rotated rapidly while a stream of air is directed at the holes from a tube. The air escaping through each hole in turn sets up a musical note. By changing the speed of rotation of the plate a note of the same pitch as that given is obtained. Then by simply multiplying the number of turns of the siren disc per second by the number of holes, one obtains the frequency or number of vibrations per second.

5.—Limits of Audibility. Experiment has shown that if the frequency of a musical tone drops below 30 vibrations per second it is no longer heard as a distinct sound. On the other hand, if the frequency becomes more than from 18,000 to 22,000 no sound whatever is heard. As one grows older the upper limit of audibility becomes lower. Koenig older people could not hear sounds above 16,384 vibrations per second.

6.—Quality. Quality is that characteristic of a musical note which enables one to distinguish between notes of the same intensity and pitch

when sounded on different instruments. Hemholtz investigated this characteristic by means of resonators (Fig. 450, text) which would respond to one frequency only. Listening to different notes with a series of such resonators, he discovered that the quality of a note was due to the presence of overtones or harmonies of the fundamental note.

7.—Fundamentals and Overtones. When a string vibrates as a whole it gives out its fundamental note. If it breaks up and vibrates in parts, that is halves, thirds, fourths, etc., it emits what is known as its first, second, third, etc. overtone respectively. When the string vibrates so as to emit both its fundamental and several of its overtones, it gives forth the quality which is characteristic of that particular string. The quality of the note emitted may be changed by the manner in which the string is set in vibration. That is, whether it is bowed, plucked, or struck with a hammer, and with the energy with which any one of these is done. That a string will vibrate either in whole or in parts may be proven in the following experiment. First stretch a string about one meter long with tension such as to cause it to vibrate with a frequency of about 256 vibrations per second. (Middle C physical pitch). Place small paper riders at the points $3/8 : 1/2 : 5/8 : 3/4$: and $7/8$ of its length. Bow gently. The string will vibrate as a whole as will be shown by all the riders being thrown off, and it will emit its fundamental note. If the riders are again placed in the same positions and the fingers of the left hand held gently against the string at $1/4$ its length while the string is gently bowed, the string will break up and vibrate in four parts. That this is so is shown by riders at $3/8 : 5/8$: and $7/8$ length of string being thrown off, while those at $1/2$ and $3/4$ length will remain on. The note emitted will be two octaves above the fundamental and is the third overtone of the fundamental. Similar experiments will show that the string may be made to vibrate in halves, thirds, or eighths. Hemholtz's experiments showed that the string when vibrating ordinarily vibrates with these overtones present as well as the fundamental. It is the presence and number of such overtones which cause the characteristic of a musical note known as quality.

8.—Sympathetic Vibrations. To set a swing in motion one is required to pump, that is, to exert a push against the board and pull on the ropes supporting it at exactly the right moment. A succession of such pulls applied at the right time sets the swing swinging with a constantly increasing amplitude. In a similar manner sound waves may set up strong vibrations in a body if they are so timed as to correspond exactly to its natural frequency of vibration. Such vibrations are known as sympathetic vibrations. They may be illustrated by having two tuning forks of the same pitch mounted on resonance boxes. If one of the tuning forks is struck and allowed to vibrate freely for a short time then grasped with the hand to stop its sound, the second fork will be found to be emitting sound. This is due to the fact that the second fork has been set in vibration sympathetically by the first. It is because of the danger from sympathetic vibrations that soldiers in crossing bridges are required to break step. Theoretically a violinist playing a note of the natural frequency as a building might cause it to vibrate sympathetically to such an extent that it would be shaken to pieces. That this is not so practically may be because of the complicated nature of the natural frequency which a building would have.

9.—Resonance. If a sounding tuning fork is held over the open

end of a glass tube while the opposite end is raised from, or lowered into, a vessel of water, a point will be found at which the tube greatly strengthens the note emitted by the sounding tuning fork. When this happens the tube is said to be in resonance with the fork. An examination of the apparatus will show that the reinforcements of the sound is caused by sound waves reflected from the closed end of the tube. As the prong of the fork makes a down stroke it sends out a compression phase of a sound wave which travels down the tube, strikes the water, and is reflected, arriving back at the prong in time to go out and strengthen the condensation sent out as the prong travels outward. Thus the length of the resonating tube must be one-half the length of a condensation phase, or one-quarter a wave length. Thus the resonating tube enables one to determine the wave length of any note. This may then be substituted in the formula $v=nl$ of which the velocity v for a given temperature is known and the frequency of the note determined. This is a much easier method of determining frequency than that previously given.

10.—Forced Vibrations. In order that the sound of a tuning fork may be heard throughout a room, the stem is placed firmly against the table top after the prongs have been set in vibration. That the sound is strengthened, is because the vibrations are transmitted through the stem to the table which is caused to vibrate with the same frequency as the fork. The table top will respond to any fork since its vibrations are forced. Sounding boards in pianos, sound boxes of violins, etc., act in much the same way and respond with forced vibrations to the vibrations of the string. Their larger surface causes more air particles to vibrate and thus strengthens the sound. Such forced vibrations are sometimes called *consonance* to distinguish them from free sympathetic vibrations discussed in the previous section, which are called *resonance*.

11.—Interference of Sound. In section 8 it was shown that under conditions for resonance one sound wave helped to build up and strengthen the other. In order that this be the case it is necessary that the two waves be of exactly the same frequency and occur in the same phase. That is, one sound must be in step with the other, condensations and rarefactions of both occurring together. If, however, two sounds of the same frequency were to occur so that condensations from the one reached the ear at the same instant as rarefactions from the other, the result on the air particles and ear drum would be that they would not vibrate at all, and no sound would be heard. Such phenomena of sound is known as interference. It may be observed by rotating a sounding tuning fork slowly while held about six inches from the ear. The sound waves emitted from between the prongs are one-half wave length out of phase with those from the outside of the prongs. Thus as the tuning fork is turned, four distinct silence areas will be found where the waves interfere.

12.—Beats. If the two mounted tuning forks used to demonstrate sympathetic vibrations in section 7 have the pitch of one of them altered slightly by loading the prongs with wax or a coin held in place by a rubber band, and are then struck at the same time, a peculiar throbbing sound will be heard in which the sound of the fork rises to a maximum and then dies away to silence. Such rising and falling sound is called *beats*. It is a result of interference. If one fork emits 256 vibrations per second and the other 255, and they are in phase at the beginning and

end of the second, they must necessarily be one-half wave length out of phase at the half-second interval. Thus at each integral second the sound will be loud, while at the half second times the sound will die away. Thus the number of beats per second will equal the difference in frequency. Use of this fact is made in tuning musical instruments. Two strings can be tuned close enough with the ear to get beats and then as they are brought nearer and nearer to the same pitch the interval between beats becomes greater and greater until when exactly in tune, the beats disappear altogether.

13.—The Major Diatonic Scale. The ear of man had for centuries before the study of the physics of sound, recognized as harmonious two or more notes of which the frequency had the relation of simple whole numbers. If the notes are as 1 to 2 they are especially harmonious and in fact the one seems to repeat the other at a higher pitch. They are thus known by the same name and one is said to be an octave above the other. If three notes have frequencies 4 : 5 : 6 they are also recognized as harmonious and are called a major triad. Any combination of notes not related by such simple frequency ratios produces a discord. The major scale is a sequence of notes such that the 1st, 3rd, and 5th form a major triad, also the 4th, 6th, and 8th, and the 5th, 7th, and 9th, or octave of the 2nd. This may be shown as in the following table:

Major Triads	C	D	E	F	G	A	B	C	D
	4		5		6				
				4		5		6	
					4		5		6
Ratios	1	9/8	5/4	4/3	3/2	5/3	15/8	2	9/4
Whole Number Ratio	24	27	30	32	36	40	45	48	
Frequencies Physical Pitch	256	288	320	337 1/3	384	426 2/3	480	512	

Note.—A Grade XI student should be able to work out this table from knowledge of major triad and notes which form it.

Any frequency may be taken for the first note of the scale and several scales are in use. On international pitch middle C of the piano is 258.6. In Physics, C forks have a frequency of 256, which is called physical pitch.

14.—Scale of Equal Temperament. In order to maintain the proper frequency ratio between notes, if any one note on a piano were selected as the key note, several new strings would have to be added for each new key selected. To overcome this difficulty, pianos, organs, and other instruments of fixed pitch are tuned in the scale of equal temperament. Five black keys are added to the octave on the keyboard of the instrument, and corresponding strings, pipes, or reeds, in its body. These are tuned in such a way that the octave is divided into twelve equal ratios called *semitones*. With this arrangement proper wires may

be found which will enable music to be played in any key without varying a great deal from that theoretically required. The result is satisfactory to most people.

15.—Laws of Vibrating Strings. The Laws of Vibrating Strings should be investigated experimentally by the student on a sonometer. A satisfactory instrument consists of a thin-walled wooden box about one meter long. Strings are fastened to pegs in one end and stretched by means of weights at the other end. They should be supported a little above the surface of the box by a fixed bridge at each end, preferably one meter apart. Then two strings of the same diameter and material are placed on the instrument and the one stretched to four times the tension of the other. The tighter string will be found to emit a note exactly one octave above the other. One may thus conclude: *The frequency of a string varies directly as the square root of the tension.*

Now place equal weights on each string. They will then emit the same note. Place a small movable bridge at the mid-point of one string. Vibrate the whole string and one-half the other. The one-half string will emit a note one octave above the whole string. Thus *the frequency of a string varies inversely as the length.*

If one changes one of the strings for one of a greater diameter or denser material, and stretches them to equal tensions, it is found that the new string emits a lower note. The exact relation found is that *the frequency varies inversely as the square root of the weight per unit length of the string.*

16.—Musical Instruments. The student should be required to clip from catalogues and paste into his note book diagrams of various musical instruments. These may be drawn into notebook if desired. Beside each figure he should write a description showing (1) how sound originates, and (2) how pitch is changed.

17.—Test. Make a numbered list of words or phrases necessary to complete the following statements:

1. A musical note is the result of (1)..... vibrations of a sounding body. The three characteristics of a musical tone are (2)....., (3)....., (4)..... The loudness of a note at a given distance depends on the (5)..... The number of vibrations per second determines the (6)..... of a note. The timbre or quality of the note is determined by the number of (7)..... present. If the frequency of a body vibrating becomes over 22,000 per second the sound becomes (8)..... The third overtone of a string is emitted when the string is vibrating in (9)..... parts. The quality of a note depends to some extent on the manner (10)..... Vibrations which result in one body because its period of vibration is the same as that of a second vibrating body are known as (11)..... The sympathetic vibrations which take place when a pipe is adjusted in length until it reinforces the sound of a tuning fork held over it, is known as (12)..... In the above case, the shortest closed pipe which will reinforce the sound is (13)..... In an open pipe the shortest length which will reinforce sound is (14)..... The silent areas found when a sounding tuning fork is held close to the ear and rotated are due to (15)..... which is caused by (16)..... The peculiar throbbing sound heard when two tuning forks differing slightly in pitch are sounded together is called (17)..... The number of silences per second will be equal to

- (18)..... The three notes of a major triad have the frequency relation
 (19)..... A note which has two times the frequency of another is
 (20)..... higher.

2. (a) What is the length of a closed tube which will resonate with a fork giving the note G physical pitch? Note C = 256 v.p.s.

(b) What is the frequency of a fork which will resonate with a closed tube 6 inches long?

Answers to 1 :— (1) rapid periodic or regular. (2) intensity or loudness. (3) pitch. (4) quality or timbre. (5) amplitude of vibration. (6) pitch. (7) overtones. (8) inaudible. (9) four. (10) in which string is caused to vibrate. (11) sympathetic vibrations. (12) resonance. (13) one-quarter the wave length of the sound. (14) one-half the wave length. (15) interference. (16) the train of waves from the centre of the fork being one-half wave length out of phase with those from the sides. (17) beats. (18) the difference in the number of vibrations per second. (19) major triad. (20) one octave.

GRADE X WRITTEN LANGUAGE

Continued from page 19

2. Small Bobby, playing at Teddy's home, is caught by rain when about to leave. Teddy's mother begins to put her boy's raincoat and rubbers on Bobby. Asked by Bobby not to take so much trouble, she replies that it is no trouble, and she is sure that his mother would do the same for her boy. Bobby replies that she would do more—she would ask Teddy to stay for lunch.

3. A negro, sent by his master to buy fish at market—fish to be perfectly fresh. At stall, negro picks up a mackerel and smells it. The fishmonger indignantly objects. Negro explains he is talking to the fish. Fishmonger sarcastically asks what he says to it. Negro says he is asking it for news of the sea. Fishmonger then asks for the fish's answer, and negro says that the fish did not know, as it had not been there for three weeks. Thereupon negro puts fish down and walks off.

4. The angel asked Caedmon to sing something and Caedmon answered that he did not know how to sing and that was why he had gone out from the feast. The vision told him again that he had something to sing, and when Caedmon asked him what he must sing the angel told him to sing of the beginning of created things.

5. Our Yankee driver said that at the bottom of the slope we would find ourselves "to hum," and plunging into a short path he pointed to a miserable hut, saying that it was a smart location, and that he wished that we Britishers might enjoy it.

GRADE XI ALGEBRA

Continued from page 26

sion. So we first make the denominator of the fraction a rational quantity by multiplying the numerator and denominator by the conjugate surd of $7 - 4\sqrt{3}$, namely, $7 + 4\sqrt{3}$, thus getting:

$$\frac{2}{7 - 4\sqrt{3}} \times \frac{7 + 4\sqrt{3}}{7 + 4\sqrt{3}} = \frac{14 + 8\sqrt{3}}{49 - 48} = 14 + 8\sqrt{3} = 14 + 8 \times 1.7321 = 27.8568$$

Hence it is customary, when a surd appears in the denominator of a fraction, to rationalize the denominator. Do questions 1-35, page 237, also questions 1-18 and 26-33, pages 238 and 239.

Examination Solutions

GRADE IX FRENCH, 1935 (Sask.)

1. *Dictation*—Sentences 1–8 inclusive, exercise A(1) Page 37 of the authorized text. The teacher shall read these sentences three times; first, to give the candidates a general idea of the passage; second, to enable them to write it in French; and third, to give them an opportunity to check their work. Candidates must not see the text.
2. (a) Give the plural of the following: son ancien général; ce bijou; votre voix; quel bel oeil; ton bal.
(b) Write the masculine of jeune; vieille; fausse; nouvelle; active; sèche.

Answer.

- (a) ses anciens généraux; ces bijoux; vos voix; quels beaux yeux; tes bals.
 - (b) jeune; vieux or vieil; faux; nouveau or nouvel; actif; sec.
3. Write in French:
(a) Is he going?
(b) Am I not?
(c) We do not eat.
(d) He isn't there.
(e) It is my former pupil.

Answer.

- (a) Va-t-il?
 - (b) Ne suis-je pas?
 - (c) Nous ne mangeons pas.
 - (d) Il n'est pas là.
 - (e) Il est mon ancien élève.
4. Fill in each blank with a suitable form of the *partitive* in the following sentences:
(a) Ils ont frères et soeurs.
(b) Donnez-moi papier et plumes.
(c) Mademoiselle a craie.
(d) Il n'a pas pain.
(e) A-t-il une plume? Il a une.

Answer.

- (a) Ils ont des frères et des soeurs.
 - (b) Donnez-moi du papier et des plumes.
 - (c) Mademoiselle a de la craie.
 - (d) Il n'a pas de pain.
 - (e) A-t-il une plume? Il en a une.
5. Translate into English:
(a) Nous sommes en classe de français.
 - (b) Écoutez-moi très attentivement mes enfants, parce que je vais vous lire un livre de Victor Hugo.

- (c) Puis au dessert, on mange du fruit et on prend du café.
- (d) Est-ce que vous vous amusez beaucoup à l'école?
- (e) Sur le mur il y a une carte de France.
- (f) Voulez-vous bien parler lentement?

Answer.

- (a) We are in a French class.
 - (b) Listen to me very attentively my children, because I am going to read you a book by Victor Hugo.
 - (c) Then at the dessert, we eat fruit and take coffee.
 - (d) Do you enjoy yourselves at school?
 - (e) On the wall there is a map of France.
 - (f) Will you please speak slowly?
6. Supply the missing preposition:
- (a) On prend le café une tasse.
 - (b) Il a une assiette la main.
 - (c) À l'école on joue tennis.
 - (d) Nous entrons la salle à manger.

Answer.

- (a) On prend le café dans une tasse.
 - (b) Il a une assiette à la main.
 - (c) À l'école on joue au tennis.
 - (d) Nous entrons dans la salle à manger.
7. Translate into French:
- (a) Where is Robert's pen? There it is on the table.
 - (b) Please open the book John and show me the word "chalk".
 - (c) What is he doing? Is he in his seat?
 - (d) In the evening I stay home and study my French lesson.
 - (e) Has he any sisters? He has one.
 - (f) I hear with my ears and see with my eyes.
 - (g) His name is Pierre, and he is ten years old.
 - (h) He listens to her and he tries to understand her.
 - (i) At what time is he going?
 - (j) Ancient history is easy, isn't it?

Answer.

- (a) La plume de Robert où est-ce? La voilà sur la table.
 - (b) Ouvrez le livre s'il vous plaît Jean et montrez-moi le mot "le craie".
 - (c) Qu'est-ce que fait-il? Est-il à son place?
 - (d) Le soir je reste chez moi et j'étudie ma leçon de français.
 - (e) A-t-il des soeurs? Il en a une.
 - (f) Je entends avec les oreilles et je vois avec les yeux.
 - (g) Il s'appelle Pierre, et il a dix ans.
 - (h) Il l'écoute et il la tâche comprendre.
 - (i) Quelle heure va-t-il?
 - (j) L'histoire ancienne est facile, n'est-ce pas?
8. Write in English:
- Jean et Georges sont chez Robert Dufour. Ils étudient leurs leçons. Ils finissent la leçon de grammaire. Jean a du papier et une plume, mais il n'a pas d'encre. Il y a des pommes et des poires dans deux assiettes sur la table. Robert en donne à ses amis.

Geogres: "Donnez-moi une poire, s'il vous plaît, Robert. En voilà cinq sur la table." (Robert en donne deux à Georges.) "Merci! Je les aime beaucoup. N'avez-vous pas de pommes?"

Robert: "J'en ai quatre. (Il donne une assiette à Georges.) Les voilà."

Jean: "Vous les aimez beaucoup, Georges, n'est-ce pas?"

Note: chez—at the home of
ils finissent—they are finishing
la pomme—the apple
la poire—the pear

Answer.

John and George are at the home of Robert Dufour. They are studying their lessons. They are finishing the grammar lesson. John has paper and pen, but he has no ink. There are apples and pears on two plates on the table. Robert gives some to his friends.

George: Give me a pear, please, Robert. There are five of them on the table." (Robert gives two of them to George.) "Thank you! I like them very much. Haven't you any apples?"

Robert: "I have four of them. He gives one plate to George. There they are."

John: "You like them very much, George, don't you?"

GRADE X GEOGRAPHY, 1935 (Sask.)

1. "The more civilized a nation is the more it depends upon others to supply its needs."
 - (a) Discuss the truth of this statement in the light of present-day conditions.
 - (b) Name five important world needs that Canada supplies and five important commodities that Canada must import from other lands.
 - (c) Describe definitely the production of one of the five imports you named in (b).

Answer.

- (a) Modern civilization is a very complex organization of society. The peoples of the more civilized nations of today are specialists producing special products suitable to their climate, natural resources, and the character of their people. Thus England with a dense population, a great deal of coal for power, and a great deal of iron ore, has become a manufacturing nation, importing raw materials and supplying the nations of the world with a vast array of manufactured goods. She must necessarily import a great deal of her food materials to support a population so great that her own agricultural lands cannot supply her needs.
- (b) Canada supplies to the world:
 1. Wheat and wheat flour; 2. printing paper, wood pulp, and lumber; 3. fish; 4. farm implements; 5. nickel.
 Canada imports:
 1. machinery; 2. crude petroleum; 3. raw rubber; 4. fruits, bananas, and citrus fruits; 5. raw sugar.
- (c) Sugar cane can only be grown successfully where there is no frost during the year. Hence sugar cane is grown on large plantations in British West Indies, Cuba, San Domingo, British Guiana,

Australia, and the Fiji Islands. When the cane is ripe it is cut, stripped of leaves, and taken to the mills. There it is crushed between huge rollers and the sweet juice extracted. The juice is collected and put through a clarifying process. The sugar is then boiled until crystallization takes place, after which the brown, sticky mass is transferred to a centrifuge. A perforated copper drum rotated very rapidly causes the liquid part to pass out through the perforations while crystallized raw sugar remains inside. This raw sugar is then sacked and shipped to Canada, where it is refined in huge refineries situated at St. John, N.B., and Vancouver, B.C.

2. (a) What is meant by international trade?
(b) Name and describe what you consider to be the three most important international trade routes, giving a definite reason for your choice in each case.
(c) Describe Canada's trade relations with other members of the British Commonwealth, indicating the possibilities for future development.

Answer.

- (a) By international trade is meant the interchange of commodities between one nation and another.
(b) The three most important international trade routes of the world are:
1. The North Atlantic trade route. From the eastern ports of the United States and Canada, more particularly New York, to the western ports of Europe and the British Isles, Liverpool, London, Hamburg. This route has more vessels travelling on it and a greater tonnage of goods carried over it than any other in the world.
2. The Suez Canal trade route from the ports of Western Europe and the British Isles and the north Atlantic ports of the United States through the straits of Gibraltar, the Mediterranean Sea, the Suez Canal, the Red Sea, and Indian Ocean to India, Ceylon, Singapore, and Australia. This route links the manufacturing centres of Europe and America with the consuming countries of the far east.
3. The Pacific Route from San Francisco, Vancouver, and other western ports to Yokohama, Hongkong, and other ports of Oriental Asia. This trade route brings to America raw silk, tea, and other products and takes to these densely populated lands manufactured products.
(c) Canada already has considerable trade with other members of the British Commonwealth of Nations. Favorable trade treaties between these sister nations enable Canada to export to them automobiles, farm machinery, fish, and lumber products which they require, and imports from them fruits, raw rubber, sugar, tea, raw cotton, etc. Future development of trade with our sister nations depends to some extent on Canada's ability to use more of their raw products. This might be accomplished by giving to these nations still more favorable terms on which their products can be imported, and educating the people of Canada to the fact that Australian, New Zealand, South African, and Indian

products are as wholesome and cheap as the same products from our more powerful neighbor to the south. Canada should also advertise still more strongly the desirability of using Canadian goods in these countries.

3. Discuss concisely *any two* of the following:
- (a) Ancient and modern movements of peoples.
 - (b) Man's dependence on plant and animal life.
 - (c) Factors determining the location and growth of cities.
 - (d) The possibilities of the development of Northern Saskatchewan.

Answer.

- (a) All movements of peoples, whether ancient or modern, have been the result of either the pressure of a very dense population causing its people to seek new homes, or invasions of hardy warlike mountain or northern tribes into more desirable plain or southern lands. In the first class comes the emigration of European peoples to the shores of America, the present invasion of Manchukuo by the Japanese, and the settlement of the great central plains of America. Into the latter class come the hordes which swept down out of Russia and Siberia over southern and western Europe, and the invasions of the shores of England by the Anglo-Saxons and the Norsemen.
- (b) Man's dominance of the earth has come about because of his superior intellect. Physically he would not be able to exist if it were not for plant and animal life. The plant kingdom furnishes him with a large portion of his food, in cereals, fruits, and roots. It also contributes to his shelter with its trees. Clothing is obtained from the cotton and flax. The animal kingdom provides flesh for food; fur, leather, and wool for clothing; and power to till his agricultural lands.
- (c) Man may place townsites seven to ten miles apart along his railroads, but only those which have favorable situations can ever develop into cities. The following are suitable locations for cities: (1) the centre of a great plain, at the intersection of roads and railroads. Winnipeg, Regina, and Edmonton are examples. (2) At the end of a mountain pass or the junction of mountain valleys. Calgary is an example. (3) At the head of navigation of a river. An example of this type is Montreal. (4) On a bay or harbour easily accessible to a populous hinterland (Vancouver). (5) Where cheap power is available, preferably near supplies of raw material (Hamilton). (6) The selection of one city as capital of a state or country gives it an advantage over rival locations and helps it to grow.
- (d) Northern Saskatchewan has many natural resources which should cause it to become highly developed in the near future. Most of that part of Saskatchewan lying north of Prince Albert is in the Canadian Shield and has not been thoroughly explored. The fact that wherever the Canadian Shield has been explored its rocks have been found to be rich in minerals, cannot help but lead to the belief that vast potential mineral wealth exists. More especially is this true when we remember the development which has taken place at Flin Flon on the one side, and Lake Athabaska on the other. The time may shortly come when a complete

series of mining ventures will complete the gap now existing between these two locations. In the lakes of northern Saskatchewan are found many of the choicest varieties of table fish. A considerable industry has already been developed which will no doubt grow greatly in the future. In falls along the numerous rivers of our northland is power which can be used to foster both mining and new industrial development.

4. "The land surface of Canada is but the present stage in a process of eternal change."
 - (a) Explain the meaning of this statement.
 - (b) Compare and contrast the chief geological characteristics of the Appalachian Region and the Western Cordillera.
 - (c) Discuss the geology of the Great Central Plain, showing its relation to the Canadian Shield.

Answer.

- (a) The above statement is true of any part of the earth's surface. Weathering wears down the rocks. Erosion of wind and water carry away the soil. The products of both above find their way to the rivers, in the waters of which they are carried down to the sea. Deposited on its bed, new rocks are formed which after ages of geological time may be upheaved to form new mountains.

<i>Chief Geological Characteristics</i>	
<i>of the Appalachian Region</i>	<i>of the Western Cordillera</i>
old	young
worn down	rugged, wearing process only started
smooth tops	rocky high peaks
largely soil covered	soil found only in valleys
forested to tops in many cases	forested on lower slopes
large amounts of hard coal	smaller amount of coal (except Alta.)
few minerals	many deposits of minerals

- (c) The Great Central Plains are composed of recently laid down rocks of the Paleozoic, Mesozoic, and Cenozoic eras. Most of such sedimentary material was carried down to the plains from the older Pre-Cambrian rocks of the Canadian Shield. Later glaciers scraped across the land from the north, sweeping the rocks of the Canadian Shield clean, and depositing soil and rocks in various moraines across the prairies.
5. (a) Describe how you would build up a museum of geological and historical interest in connection with your school or community, indicating definitely what part the pupils would have in this project.
 - (b) Describe how your school made a study of one of the following problems: (i) protection of wild bird life, (ii) conservation of natural resources, (iii) afforestation in Saskatchewan, (iv) drought control.

Answer.

- (a) As a project the students of a school might collect different surface rocks of the district. These should be classified as well as possible with the use of reference books. Each worth preserving should have a label affixed showing what it is, where it was found, who discovered and identified it. In order to make a collection

of this kind worth while, a cabinet suitable for housing should be provided. An interesting project for a single student would be to keep samples of strata found every few feet, as a well or number of wells in the district were being sunk. Essays might be required from the students explaining the presence in the soil of rocks which are not found as part of solid rock of the earth within several hundreds of miles.

- (b) Answer to this part will depend on whether or not your school has studied such a problem. If they have, a simple essay telling what was done should be assigned its appropriate share of the marks allotted.

6. Write a paragraph on each of any four of the following:

- (a) The size of the planets.
- (b) Eclipses of the sun and moon.
- (c) Standard Time.
- (d) The causes of the trade winds.
- (e) The causes of tides.
- (f) The monsoons.

Answer.

- (a) The minor planets are in order from the sun outward—Mercury, Venus, the Earth, and Mars. Of these the Earth is the largest, Venus about the same size, Mars smaller, and Mercury the smallest. The major planets in the same order are Jupiter, Saturn, Uranus, Neptune, and Pluto. Jupiter is the largest of all the planets, and has an equatorial diameter eleven times that of the earth. Uranus and Neptune are smaller than this, and Pluto is about the same size as the Earth.
- (b) The earth revolves about the sun once each year, and the moon about the earth once each twenty-eight days. At certain times the moon comes directly between the sun and the earth. At that time persons in the path of the moon's shadow across the earth cannot see the sun and one says the sun is eclipsed. On still other occasions the earth passes between the sun and the moon. The moon is then seen dimly in the shadow of the earth. When this happens, one says the moon is eclipsed.
- (c) As the earth turns on its axis each twenty-four hours, different parts of its face are constantly directed toward the sun. That is, different parts are constantly having solar noon. Because it is inconvenient to have times from place to place different, the surface of the earth is divided into time belts, each approximately fifteen degrees in width. The noon time of the meridian closest to the centre of the belt is taken as the Standard Time for the whole belt. Thus Saskatoon has a Standard Time known as Mountain Standard Time. This is the solar time of the 105th meridian which passes close to Humboldt. It is solar noon in Saskatoon some six minutes after noon Mountain Standard Time.
- (d) The direct rays of the sun in the tropics warm the earth and it in turn warms the air above to such an extent that it rises. Cool air from the northern and southern regions rushes in to fill the low pressure area left by the warm air. The spin of the earth from west to east causes these winds to come toward the tropics from the northeast and southeast.

- (e) The law of gravitation first worded by Sir Isaac Newton is that every body in the universe attracts every other body. Thus both the moon and the sun exert an attraction on the earth. This attraction pulls water on the side of the earth next the moon away from the earth, and pulls the earth away from the water on the side of the earth opposite the moon. As the earth turns on its axis these hills of water chase across the oceans in the opposite direction, causing the water to rise as it approaches each shore as tides. The moon's attraction is greater and causes higher tides than that of the sun since it is closer. When the two pull parallel, the tides are especially high, and when their attraction is at right angles the tides are rather low.
- (f) On June 21 the sun is directly over the Tropic of Cancer. Thus the large land masses of southern Asia become very warm. The air above them becomes heated, and rising, causes an extremely low pressure. Into this area winds blow from the south. These are known as the summer monsoons. They bring with them a great deal of moisture. In the winter the opposite conditions prevail. The sun's rays fall directly on the Indian Ocean. The air here rises, thus creating a low pressure, and the winter monsoon blows from the land to the sea.

TOPICS OF INTEREST

Continued from page 4

policy of limiting the naval strength of each power both in quantity and in quality, and in addition the abolition of the submarine. The French and Italian delegates opposed any "by three" battle fleet ratio and pressed for limitation of tonnages and guns for each class of warship.

Japan Withdraws

On January 15 the Japanese delegates withdrew from the conference. Their request for parity or a common upper limit was refused, and unable to accept any compromise arrangement, they felt that as far as they were concerned nothing could be gained by prolonging the discussions.

After the withdrawal of Japan, the remaining four powers continued in session. On January 31 it was reported that the four-power conference had agreed that each will announce at the first of each year what their naval construction will be during the following twelve months.

The plan offered as a compromise in an effort to limit the possibilities of a naval construction race, was the first major agreement reached by the conference in nearly three months of work. The information supplied by each power would apply to all vessels of more than 100 tons. Keels could not be laid down until four months after the exchange of information. If there were any radical change in the programs after information had been supplied, then there would be a new notification and a further four-month delay in laying down keels.

The agreement arrived at, it is generally admitted, is but a poor substitute for the terms of the Treaties of Washington and London. Time alone will answer the question "Will the next ten years witness another mad race for naval supremacy?" One thing the conference does reveal is that the nations today are much less peace-minded than they were when the historic agreement of naval limitation was concluded in 1922.

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